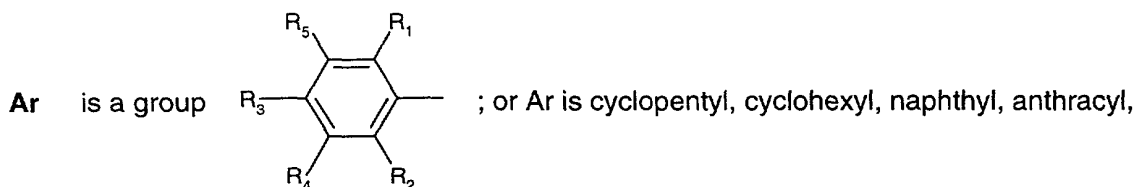
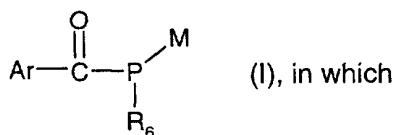


What is claimed is

1. A compound of the formula I



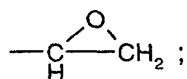
biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen, C₁-C₄alkyl and/or C₁-C₄alkoxy;

R₁ and **R₂** independently of one another are C₁-C₂₀alkyl, OR₁₁, CF₃ or halogen;

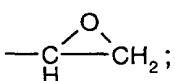
R₃, **R₄** and **R₅** independently of one another are hydrogen, C₁-C₂₀alkyl, OR₁₁ or halogen;

or in each case two of the radicals **R₁**, **R₂**, **R₃**, **R₄** and **R₅** together form C₁-C₂₀alkylene, which can be interrupted by O, S or NR₁₄;

R₆ is C₁-C₂₄alkyl, unsubstituted or substituted by cycloalkenyl, phenyl, CN, C(O)R₁₁, C(O)OR₁₁, C(O)N(R₁₄)₂, OC(O)R₁₁, OC(O)OR₁₁, N(R₁₄)C(O)N(R₁₄), OC(O)NR₁₄,

N(R₁₄)C(O)OR₁₁, cycloalkyl, halogen, OR₁₁, SR₁₁, N(R₁₂)(R₁₃) or ;

C₂-C₂₄alkyl which is interrupted once or more than once by nonconsecutive O, S or NR₁₄ and which is unsubstituted or substituted by phenyl, OR₁₁, SR₁₁, N(R₁₂)(R₁₃), CN, C(O)R₁₁,

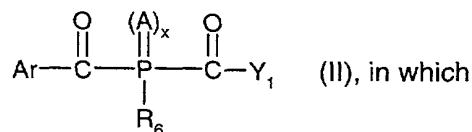
C(O)OR₁₁, C(O)N(R₁₄)₂ and/or .

C₂-C₂₄alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR₁₄ and which is unsubstituted or substituted by OR₁₁, SR₁₁ or N(R₁₂)(R₁₃);

C₅-C₂₄cycloalkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR₁₄ and which is unsubstituted or substituted by OR₁₁, SR₁₁ or N(R₁₂)(R₁₃);

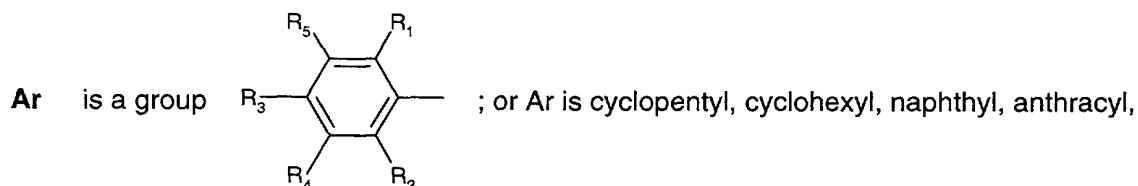
C_7-C_{24} arylalkyl which is unsubstituted or substituted on the aryl group by C_1-C_{12} alkyl, C_1-C_{12} alkoxy or halogen;
 C_4-C_{24} cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or NR_{14} and which is unsubstituted or substituted by OR_{11} , SR_{11} or $N(R_{12})(R_{13})$;
 or C_8-C_{24} arylcycloalkyl or C_8-C_{24} arylcycloalkenyl;
 R_{11} is H, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_3-C_8 cycloalkyl, phenyl, benzyl or C_2-C_{20} alkyl, which is interrupted once or more than once by O or S and which is unsubstituted or is substituted by OH and/or SH;
 R_{12} and R_{13} independently of one another are hydrogen, C_1-C_{20} alkyl, C_3-C_8 cycloalkyl, phenyl, benzyl or C_2-C_{20} alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH; or R_{12} and R_{13} together are C_3-C_5 alkylene which is uninterrupted or interrupted by O, S or NR_{14} ;
 R_{14} is hydrogen, phenyl, C_1-C_{12} alkyl or C_2-C_{12} alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; and
M is hydrogen, Li, Na or K.

2. A compound of the formula II



A is O or S;

x is 0 or 1;



R_1 and R_2 independently of one another are C_1-C_{20} alkyl, OR_{11} , CF_3 or halogen;

R_3 , R_4 and R_5 independently of one another are hydrogen, C_1-C_{20} alkyl, OR_{11} or halogen;

or in each case two of the radicals R_1 , R_2 , R_3 , R_4 and R_5 together form C_1 - C_{20} alkylene which can be interrupted by O, S or $-NR_{14}$;

R_6 is C_1 - C_{24} alkyl, unsubstituted or substituted by C_5 - C_{24} cycloalkenyl, phenyl, CN, $C(O)R_{11}$, $C(O)OR_{11}$, $C(O)N(R_{14})_2$, $OC(O)R_{11}$, $OC(O)OR_{11}$, $N(R_{14})C(O)N(R_{14})$, $OC(O)NR_{14}$, $N(R_{14})C(O)OR_{11}$, cycloalkyl, halogen, OR_{11} , SR_{11} , $N(R_{12})(R_{13})$ or $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$;

C_2 - C_{24} alkyl which is interrupted once or more than once by nonconsecutive O, S or NR_{14} and which is unsubstituted or substituted by phenyl, OR_{11} , SR_{11} , $N(R_{12})(R_{13})$, CN, $C(O)R_{11}$, $C(O)OR_{11}$, $C(O)N(R_{14})_2$ and/or $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$;

C_2 - C_{24} alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR_{14} and which is unsubstituted or substituted by OR_{11} , SR_{11} or $N(R_{12})(R_{13})$;

C_5 - C_{24} cycloalkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR_{14} and which is unsubstituted or substituted by OR_{11} , SR_{11} or $N(R_{12})(R_{13})$;

C_7 - C_{24} arylalkyl which is unsubstituted or substituted on the aryl group by C_1 - C_{12} alkyl, C_1 - C_{12} alkoxy or halogen;

C_4 - C_{24} cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or NR_{14} and which is unsubstituted or substituted by OR_{11} , SR_{11} or $N(R_{12})(R_{13})$; or

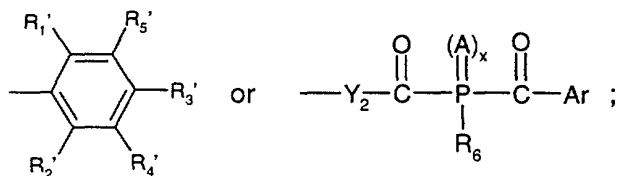
C_8 - C_{24} aryl(cycloalkyl) or C_8 - C_{24} aryl(cycloalkenyl);

R_{11} is H, C_1 - C_{20} alkyl, C_2 - C_{20} alkenyl, C_3 - C_8 cycloalkyl, phenyl, benzyl or C_2 - C_{20} alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;

R_{12} and R_{13} independently of one another are hydrogen, C_1 - C_{20} alkyl, C_3 - C_8 cycloalkyl, phenyl, benzyl or C_2 - C_{20} alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; or R_{12} and R_{13} together are

C_3 - C_5 alkylene which is uninterrupted or interrupted by O, S or NR_{14} ;

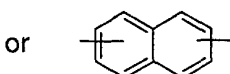
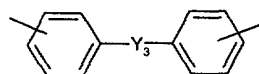
Y_1 is C_1 - C_{18} alkyl which is unsubstituted or substituted by one or more phenyl; C_1 - C_{18} halogenoalkyl; C_2 - C_{18} alkyl which is interrupted once or more than once by O or S and which can be substituted by OH and/or SH; unsubstituted C_3 - C_{18} cycloalkyl or C_3 - C_{18} cycloalkyl substituted by C_1 - C_{20} alkyl, OR_{11} , CF_3 or halogen; C_2 - C_{18} alkenyl; or Y_1 is OR_{11} , $N(R_{12})(R_{13})$ or one of the radicals



or Y_1 is cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen, C_1 - C_4 alkyl and/or C_1 - C_4 alkoxy;

Y_2 is a direct bond; unsubstituted or phenyl-substituted C_1 - C_{18} alkylene; unsubstituted C_4 - C_{18} -cycloalkylene or C_4 - C_{18} cycloalkylene substituted by C_1 - C_{12} alkyl, OR_{11} , halogen and/or phenyl; unsubstituted C_5 - C_{18} cycloalkenylene or C_5 - C_{18} cycloalkenylene substituted by C_1 - C_{12} alkyl, OR_{11} , halogen and/or phenyl; unsubstituted phenylene or phenylene substituted one to four times by C_1 - C_{12} alkyl, OR_{11} , halogen, $-(CO)OR_{14}$, $-(CO)N(R_{12})(R_{13})$ and/or phenyl;

or Y_2 is a radical



, where these radicals are

unsubstituted or are substituted one to four times on one or both aromatic ring(s) by C_1 - C_{12} alkyl, OR_{11} , halogen and/or phenyl;

Y_3 is O, S, SO, SO_2 , CH_2 , $C(CH_3)_2$, $CHCH_3$, $C(CF_3)_2$, CO or a direct bond;

R_{14} is hydrogen, phenyl, C_1 - C_{12} alkyl or C_2 - C_{12} alkyl which is interrupted once or more than once by O or S and which can be substituted by OH and/or SH;

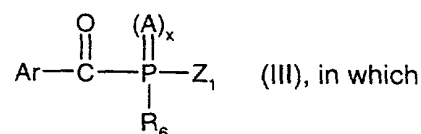
R_1' and R_2' independently of one another have the same meanings as given for R_1 and R_2 ; and

R_3' , R_4' and R_5' independently of one another have the same meanings as given for R_3 , R_4 and R_5 ;

or in each case two of the radicals R_1' , R_2' , R_3' , R_4' and R_5' together form C_1 - C_{20} alkylene which may be interrupted by O, S or $-NR_{14}$;

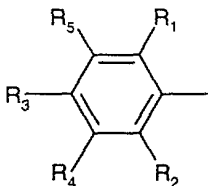
with the proviso that Y_1 is not identical to Ar.

3. A compound of the formula III



A is O or S;

x is 0 or 1;

Ar is a group ; or Ar is cyclopentyl, cyclohexyl, naphthyl, anthracyl,

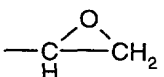
biphenyl or an O-, S- or N-containing 5- or 6-membered heterocyclic ring, where the radicals cyclopentyl, cyclohexyl, naphthyl, anthracyl, biphenyl and 5- or 6-membered heterocyclic ring are unsubstituted or substituted by halogen, C₁-C₄alkyl and/or C₁-C₄alkoxy;

R₁ and **R₂** independently of one another are C₁-C₂₀alkyl, OR₁₁, CF₃ or halogen;

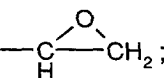
R₃, **R₄** and **R₅** independently of one another are hydrogen, C₁-C₂₀alkyl, OR₁₁ or halogen;

or in each case two of the radicals **R₁**, **R₂**, **R₃**, **R₄** and **R₅** together form C₁-C₂₀alkylene which can be interrupted by O, S or -NR₁₄;

R₆ is C₁-C₂₄alkyl, unsubstituted or substituted by C₅-C₂₄cycloalkenyl, phenyl, CN, C(O)R₁₁, C(O)OR₁₁, C(O)N(R₁₄)₂, OC(O)R₁₁, OC(O)OR₁₁, N(R₁₄)C(O)N(R₁₄), OC(O)NR₁₄,

N(R₁₄)C(O)OR₁₁, cycloalkyl, halogen, OR₁₁, SR₁₁, N(R₁₂)(R₁₃) or ;

C₂-C₂₄alkyl which is interrupted once or more than once by nonconsecutive O, S or NR₁₄ and which is unsubstituted or substituted by phenyl, OR₁₁, SR₁₁, N(R₁₂)(R₁₃), CN, C(O)R₁₁,

C(O)OR₁₁, C(O)N(R₁₄)₂ and/or ;

C₂-C₂₄alkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR₁₄ and which is unsubstituted or substituted by OR₁₁, SR₁₁ or N(R₁₂)(R₁₃);

C₅-C₂₄cycloalkenyl which is uninterrupted or interrupted once or more than once by nonconsecutive O, S or NR₁₄ and which is unsubstituted or substituted by OR₁₁, SR₁₁ or N(R₁₂)(R₁₃);

C₇-C₂₄arylalkyl which is unsubstituted or substituted on the aryl group by C₁-C₁₂alkyl, C₁-C₁₂alkoxy or halogen;

C₄-C₂₄cycloalkyl which is uninterrupted or interrupted once or more than once by O, S and/or NR₁₄ and which is unsubstituted or substituted by OR₁₁, SR₁₁ or N(R₁₂)(R₁₃); or

C₈-C₂₄arylcycloalkyl or C₈-C₂₄arylcycloalkenyl;

R₁₁ is H, C₁-C₂₀alkyl, C₂-C₂₀alkenyl, C₃-C₈cycloalkyl, phenyl, benzyl or C₂-C₂₀alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH;

R₁₂ and **R₁₃** independently of one another are hydrogen, C₁-C₂₀alkyl, C₃-C₈cycloalkyl, phenyl, benzyl or C₂-C₂₀alkyl, which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH; or **R₁₂** and **R₁₃** together are C₃-C₅alkylene which is uninterrupted or interrupted by O, S or NR₁₄;

Z₁ is C₁-C₂₄alkyl, which is unsubstituted or substituted once or more than once by OR₁₅,

SR₁₅, N(R₁₆)(R₁₇), phenyl, halogen, CN, -N=C=A, $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$, $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---R}_{18}$, $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---OR}_{18}$

and/or $\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---N(R}_{18})_2$ or **Z₁** is C₂-C₂₄alkyl which is interrupted once or more than once by O, S or NR₁₄ and which can be substituted by OR₁₅, SR₁₅, N(R₁₆)(R₁₇), phenyl, halogen,

$\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$, $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---R}_{18}$, $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---OR}_{18}$ and/or $\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---N(R}_{18})_2$; or **Z₁** is C₁-C₂₄alkoxy,

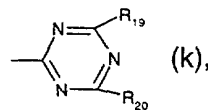
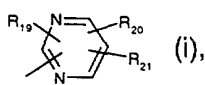
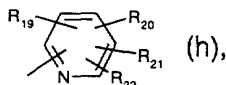
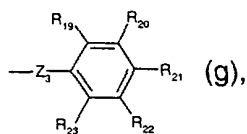
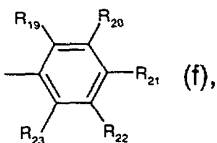
which is substituted once or more than once by phenyl, CN, -N=C=A, $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$,

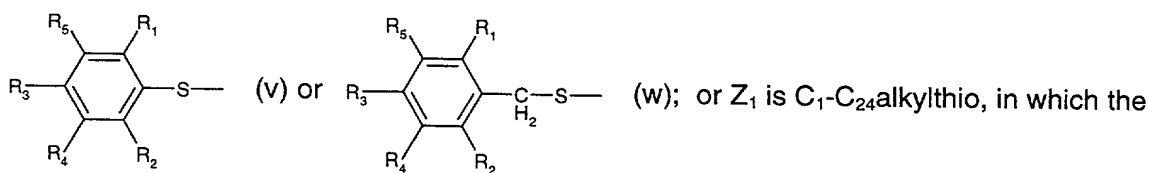
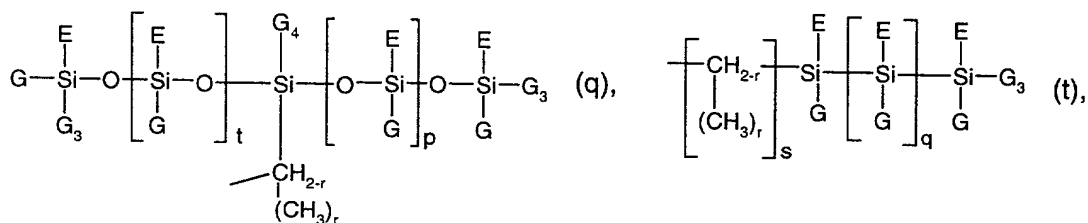
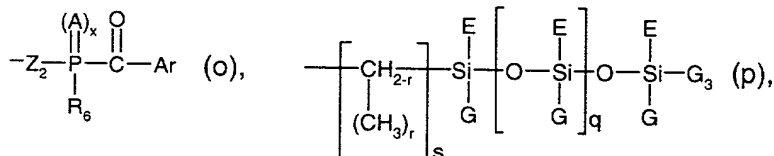
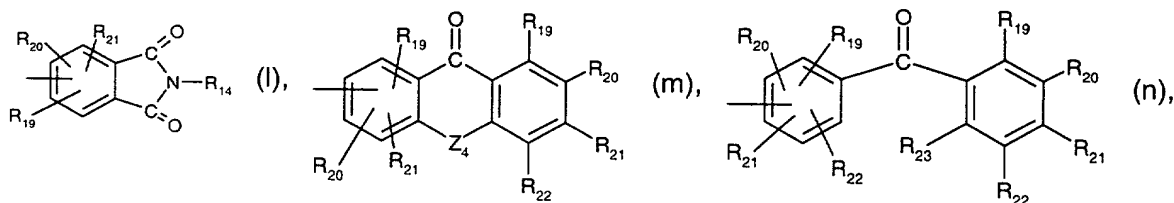
$\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---R}_{18}$, $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---OR}_{18}$ and/or $\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---N(R}_{18})_2$; or **Z₁** is $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---OR}_{11}$,

$\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---N(R}_{16})\text{(R}_{17})$, $\text{---}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{---OR}_{11a}$ or $\text{---}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{---N(R}_{18a})\text{(R}_{18b})$; or **Z₁** is unsubstituted

C₃-C₂₄cycloalkyl or C₃-C₂₄cycloalkyl substituted by C₁-C₂₀alkyl, OR₁₁, CF₃ or halogen; unsubstituted C₂-C₂₄alkenyl or C₂-C₂₄alkenyl substituted by C₆-C₁₂aryl, CN, (CO)OR₁₅ or

(CO)N(R₁₈)₂; or **Z₁** is C₃-C₂₄cycloalkenyl or is one of the radicals



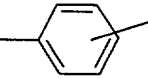
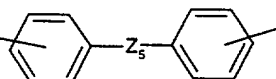


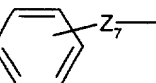
alkyl radical is uninterrupted or interrupted once or more than once by nonconsecutive O or S, and is unsubstituted or substituted by OR₁₅, SR₁₅ and/or halogen; with the proviso that Z₁ and R₆ are not identical;

A₁ is O, S or NR_{18a};

Z₂ is C₁-C₂₄alkylene; C₂-C₂₄alkylene interrupted once or more than once by O, S or NR₁₄; C₂-C₂₄alkenylene; C₂-C₂₄alkenylene interrupted once or more than once by O, S or NR₁₄; C₃-C₂₄cycloalkylene; C₃-C₂₄cycloalkylene interrupted once or more than once by O, S or NR₁₄; C₃-C₂₄cycloalkylene; C₃-C₂₄cycloalkenylene interrupted once or more than once by O, S or NR₁₄;

where the radicals C₁-C₂₄alkylene, C₂-C₂₄alkylene, C₂-C₂₄alkenylene, C₃-C₂₄cycloalkylene and C₃-C₂₄cycloalkenylene are unsubstituted or are substituted by OR₁₁, SR₁₁, N(R₁₂)(R₁₃)

and/or halogen; or Z₂ is one of the radicals  , 

or $\text{---Z}_8\text{---}$  $\text{---Z}_7\text{---}$, where these radicals are unsubstituted or are substituted on the

aromatic by C₁-C₂₀alkyl; C₂-C₂₀alkyl which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH; OR₁₁, SR₁₁, N(R₁₂)(R₁₃), phenyl, halogen, NO₂, CN, (CO)-OR₁₁, (CO)-R₁₁, (CO)-N(R₁₂)(R₁₃), SO₂R₂₄, OSO₂R₂₄, CF₃ and/or CCl₃;

or Z₂ is a group $\left[\text{---CH}_{2-r}\text{---} \right]_s \left[\begin{array}{c} \text{E} \\ | \\ \text{Si} \\ | \\ \text{G} \end{array} \right] \text{O} \left[\begin{array}{c} \text{E} \\ | \\ \text{Si} \\ | \\ \text{G} \end{array} \right]_q \text{O} \left[\begin{array}{c} \text{E} \\ | \\ \text{Si} \\ | \\ \text{G} \end{array} \right] \left[\text{---CH}_{2-r}\text{---} \right]_s$ (r) or

$\left[\text{---CH}_{2-r}\text{---} \right]_s \left[\begin{array}{c} \text{E} \\ | \\ \text{Si} \\ | \\ \text{G} \end{array} \right]_q \left[\begin{array}{c} \text{E} \\ | \\ \text{Si} \\ | \\ \text{G} \end{array} \right] \left[\text{---CH}_{2-r}\text{---} \right]_s$ (u);

Z₃ is CH₂, CH(OH), CH(CH₃) or C(CH₃)₂;

Z₄ is S, O, CH₂, C=O, NR₁₄ or a direct bond;

Z₅ is S, O, CH₂, CHCH₃, C(CH₃)₂, C(CF₃)₂, SO, SO₂, CO;

Z₆ and **Z₇** independently of one another are CH₂, CHCH₃ or C(CH₃)₂;

r is 0, 1 or 2;

s is a number from 1 to 12;

q is a number from 0 to 50;

t and **p** are each a number from 0 to 20;

E, **G**, **G₃** and **G₄** independently of one another are unsubstituted C₁-C₁₂alkyl or C₁-C₁₂alkyl substituted by halogen, or are unsubstituted phenyl or phenyl substituted by one or more C₁-C₄alkyl; or are C₂-C₁₂alkenyl;

R_{11a} is C₁-C₂₀alkyl substituted once or more than once by OR₁₅ or $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$; or is

C₂-C₂₀alkyl which is interrupted once or more than once by nonconsecutive O atoms and is

unsubstituted or substituted once or more than once by OR₁₅, halogen or $\text{---}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{---CH}_2$; or **R_{11a}** is

C₂-C₂₀alkenyl, C₃-C₁₂alkynyl; or **R_{11a}** is C₃-C₁₂cycloalkenyl which is substituted once or

more than once by halogen, NO₂, C₁-C₆alkyl, OR₁₁ or C(O)OR₁₈; or C₇-C₁₆arylalkyl or C₈-C₁₆arylcyaloalkyl;

R₁₄ is hydrogen, phenyl, C₁-C₁₂alkoxy, C₁-C₁₂alkyl or C₂-C₁₂alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH and/or SH;

R₁₅ has one of the meanings given for **R₁₁** or is a radical $\text{—}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{—R}_{18}$, $\text{—}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{—OR}_{18}$ or $\text{—}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{—N(R}_{18})_2$;

R₁₆ and **R₁₇** independently of one another have one of the meanings given for **R₁₂** or are a radical $\text{—}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{—R}_{18}$, $\text{—}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{—OR}_{18}$ or $\text{—}\overset{\text{A}_1}{\underset{\text{||}}{\text{C}}}\text{—N(R}_{18})_2$;

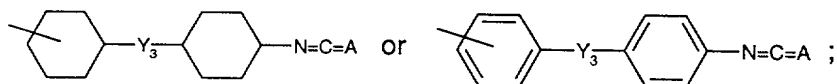
R₁₈ is hydrogen, C₁-C₂₄alkyl, C₂-C₁₂alkenyl, C₃-C₈cycloalkyl, phenyl, benzyl; C₂-C₂₀alkyl which is interrupted once or more than once by O or S and which is unsubstituted or substituted by OH;

R_{18a} and **R_{18b}** independently of one another are hydrogen; C₁-C₂₀alkyl, which is substituted once or more than once by OR₁₅, halogen, styryl, methylstyryl, -N=C=A or $\text{—}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{—CH}_2$; or

C₂-C₂₀alkyl, which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted once or more than once by OR₁₅, halogen, styryl,

methylstyryl or $\text{—}\overset{\text{O}}{\underset{\text{H}}{\text{C}}}\text{—CH}_2$; or **R_{18a}** and **R_{18b}** are C₂-C₁₂alkenyl; C₅-C₁₂cycloalkyl, which is

substituted by -N=C=A or -CH₂-N=C=A and is additionally unsubstituted or substituted by one or more C₁-C₄alkyl; or **R_{18a}** and **R_{18b}** are C₆-C₁₂aryl, unsubstituted or substituted once or more than once by halogen, NO₂, C₁-C₆alkyl, C₂-C₄alkenyl, OR₁₁, -N=C=A, -CH₂-N=C=A or C(O)OR₁₈; or **R_{18a}** and **R_{18b}** are C₇-C₁₆arylalkyl; or **R_{18a}** and **R_{18b}** together are C₈-C₁₆arylcyaloalkyl; or **R_{18a}** and **R_{18b}** independently of one another are



Y₃ is O, S, SO, SO₂, CH₂, C(CH₃)₂, CHCH₃, C(CF₃)₂, (CO), or a direct bond;

R₁₉, **R₂₀**, **R₂₁**, **R₂₂** and **R₂₃** independently of one another are hydrogen, C₁-C₂₀alkyl; C₂-C₂₀alkyl, which is interrupted once or more than once by nonconsecutive O atoms and which is unsubstituted or substituted by OH and/or SH; or **R₁₉**, **R₂₀**, **R₂₁**, **R₂₂** and **R₂₃** are

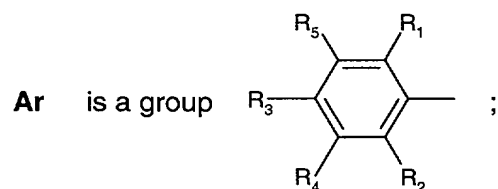
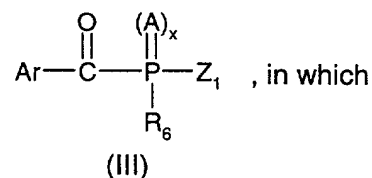
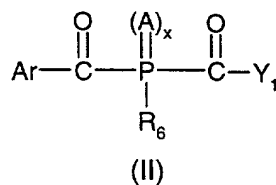
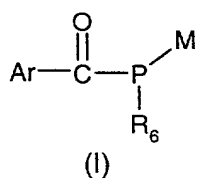
OR₁₁, SR₁₁, N(R₁₂)(R₁₃), NO₂, CN, SO₂R₂₄, OSO₂R₂₄, CF₃, CCl₃, halogen; or phenyl which is unsubstituted or substituted once or more than once by C₁-C₄alkyl or C₁-C₄alkoxy;

or in each case two of the radicals R₁₉, R₂₀, R₂₁, R₂₂ and R₂₃ together form C₁-C₂₀alkylene which is uninterrupted or interrupted by O, S or -NR₁₄;

R₂₄ is C₁-C₁₂alkyl, halogen-substituted C₁-C₁₂alkyl, phenyl, or phenyl substituted by OR₁₁ and/or SR₁₁;

with the proviso that R₆ and Z₁ are not identical.

4. A compound of the formula I, II or III



R₁ and R₂ independently of one another are C₁-C₈alkyl or OR₁₁ ;

R₃, R₄ and R₅ independently of one another are hydrogen or C₁-C₈alkyl;

R₆ is C₁-C₁₂alkyl;

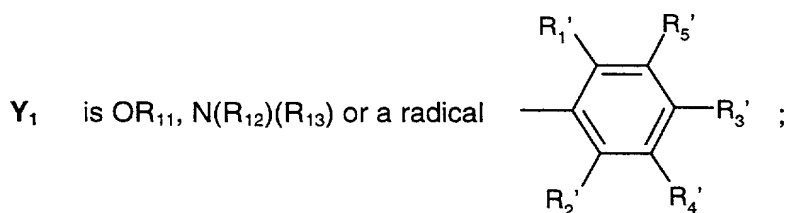
R₁₁ is H or C₁-C₈alkyl;

R₁₂ and R₁₃ independently of one another are hydrogen or C₁-C₈alkyl;

M is hydrogen or Li;

A is O;

x is 1;



R₁' and R₂' independently of one another have the same meanings given for R₁ and R₂; and

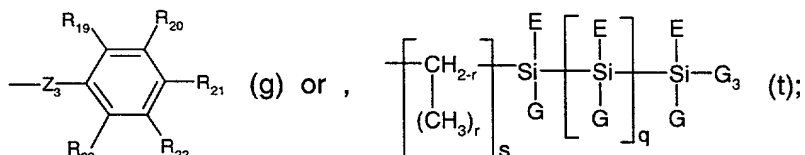
R₃', **R₄'** and **R₅'** independently of one another have the same meanings as given for **R₃**, **R₄** and **R₅**;

with the proviso that **Y₁** is not identical to **Ar**;

Z₁ is C₁-C₁₂alkyl which is unsubstituted or substituted once or more than once by **OR₁₅**,

phenyl and/or $\text{—}\overset{\text{A}}{\underset{\text{||}}{\text{C}}}\text{—OR}_{18}$; or **Z₁** is unsubstituted or **OR₁₁**-substituted C₃-C₂₄cycloalkyl; or

Z₁ is one of the radicals



Z₃ is CH₂ or CH(OH);

r is 0;

s is 1;

E, **G** and **G₃** independently of one another are unsubstituted C₁-C₄alkyl;

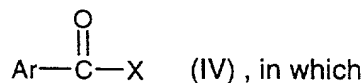
R₁₅ has one of the meanings given for **R₁₁**;

R₁₈ is C₁-C₁₂alkyl; and

R₁₉, **R₂₀**, **R₂₁**, **R₂₂** and **R₂₃** independently of one another are hydrogen or halogen; and with the proviso that **R₆** and **Z₁** are not identical.

5. / A process for the selective preparation of compounds of the formula I according to claim 1, by

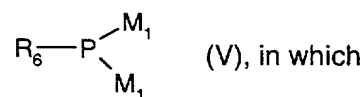
(1) reaction of an acyl halide of the formula IV



Ar is as defined in claim 1, and

X is Cl or Br;

with a dimetalated organophosphine of the formula V



R₆ is as defined in claim 1; and

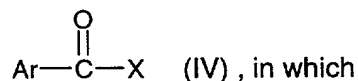
M₁ is Na, Li or K;

in the molar ratio 1:1; and

(2) where appropriate, subsequent hydrolysis of compounds of the formula I in which M is hydrogen are to be obtained.

6. The use of compounds of the formula I as starting materials for the preparation of mono- or bisacylphosphines, mono- or bisacylphosphine oxides or mono- or bisacylphosphine sulfides.

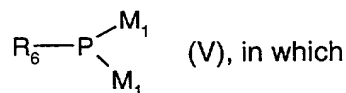
7. A process for the preparation of compounds of the formula II according to claim 2 by
(1) reaction of an acyl halide of the formula IV



Ar is as defined in claim 2, and

X is Cl or Br;

with a dimetalated organophosphine of the formula V

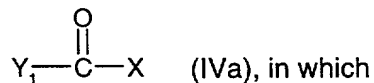


R₆ is as defined in claim 2; and

M₁ is Na, Li or K;

in the molar ratio of approximately 1:1;

(2) subsequent reaction of the product with an acyl halide of the formula IVa



Y₁ is as defined in claim 2; and

X is as defined above;

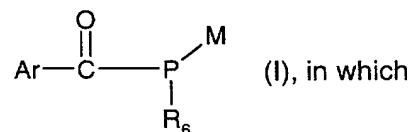
with the proviso that the acyl halide of the formula IV is not identical to the acyl halide of the formula IVa;

in the molar ratio of approximately 1:1; and,

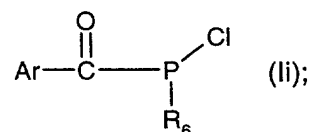
(3) if compounds of the formula II, in which A is oxygen or sulfur are to be obtained, subsequent oxidation or sulfurization of the phosphine compounds.

8. A process for the preparation of compounds of the formula II according to claim 2, in which **A** is oxygen and **x** is 1, by

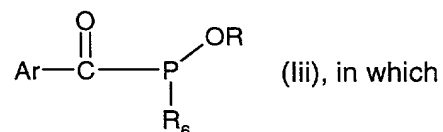
(1) reaction of a compound of the formula (I), according to claim 1



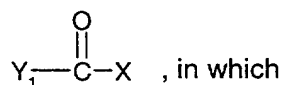
Ar, **M** and **R₆** are as defined in claim 1,
with phosgene to give the corresponding phosphine chloride (II)



(2) subsequent reaction with an alcohol to give the compound of the formula (III)



R is the radical of an alcohol, in particular C₁-C₁₂alkyl, C₅-C₈cycloalkyl or benzyl; and
(3) reaction of the resulting compound of the formula (III) with an acyl halide



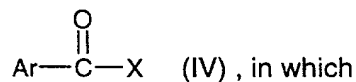
Y₁ is as defined in claim 2, and

X is Cl or Br,

to give the compound of the formula II but in which **Ar** and **Y₁** are not necessarily different.

9. A process for the preparation of compounds of the formula III

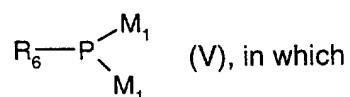
(1) by reaction of an acyl halide of the formula IV



Ar is as defined in claim 3, and

X is Cl or Br;

with a dimetalated organophosphine of the formula V

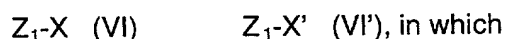


R₆ is as defined in claim 3; and

M₁ is Na, Li or K;

in the molar ratio of approximately 1:1;

(2) subsequent reaction of the product with a compound of the formula VI or VI'



Z₁ is as defined in claim 3 ; and

X is as defined above; and

X' is -N=C=A, -N=C=N=Z₁, $-\overset{\text{O}}{\underset{\text{H}}{\text{C}}}-\text{CH}_2$ or -CHO;

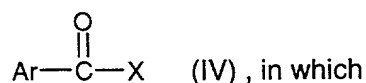
with the proviso that, Z₁ is not identical to R₆;

in the molar ratio of approximately 1:1; and, in the case where Z₁ is not a group (v), (w) or C₁-C₁₂alkylthio, and

(3) compounds of the formula III, in which A is oxygen or sulfur are to be obtained, subsequent oxidation or sulfurization of the resulting phosphine compounds.

10. A process for the preparation of compounds of the formula III, according to claim 3,

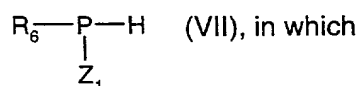
(1) by reaction of an acyl halide of the formula IV



Ar is as defined in claim 1, and

X is Cl or Br;

with an unsymmetrical phosphine of the formula VII



R₆ is as defined in claim 1, and

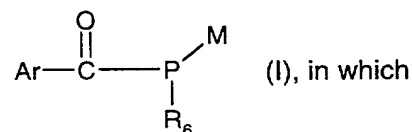
Z₁ is as defined in claim 3 with the proviso that R₆ and Z₁ are not identical;

in the molar ratio of approximately 1:1, in the presence of a base or an organolithium compound, to give the corresponding acylphosphine; and

(2) subsequent oxidation or sulfurization of the thus obtained acylphosphine.

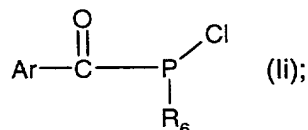
11. A process for the preparation of compounds of the formula III according to claim 3, in which **A** is oxygen and **x** is 1, by

(1) reaction of the compound of the formula (I), according to claim 1

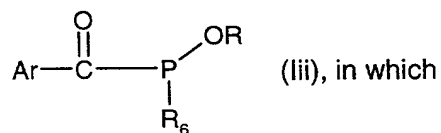


Ar, **M** and **R₆** is as defined in claim 1,

with phosgene to give the corresponding phosphine chloride (II)



(2) subsequent reaction with an alcohol to give the compound of the formula (III)



R is the radical of an alcohol, in particular C₁-C₁₂alkyl, C₅-C₈cycloalkyl or benzyl; and

(3) reaction of the resulting compound of the formula (III) with an organoylhalide

Z₁-X, in which

Z₁ is as defined in claim 3, but is not identical to **R₆** from the formula (I) ist, and

X is Cl or Br,

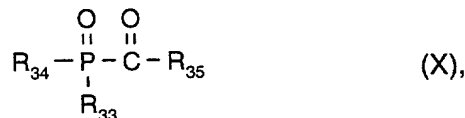
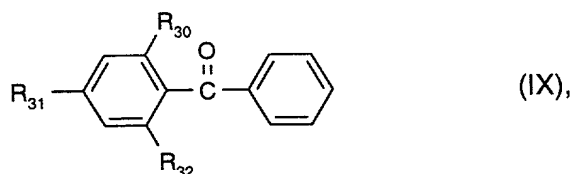
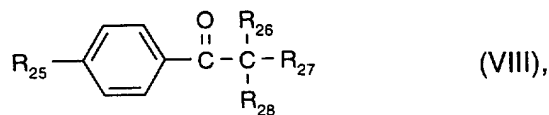
to give the compound of the formula III.

12. A photocurable composition comprising

- (a) at least one ethylenically unsaturated photopolymerizable compound and
- (b) at least one compound of the formula II or III as photoinitiator.

13. A photocurable composition according to claim 12, comprising, in addition to components (a) and (b), further photoinitiators (c) and/or further additives (d).

14. A photocurable composition as claimed in claim 13, comprising, as further photoinitiator (c), at least one compound of the formula VIII, IX, X, XI



R₂₅ is hydrogen, C₁-C₁₈alkyl, C₁-C₁₈alkoxy, -OCH₂CH₂-OR₂₉, morpholino, SCH₃,

a group $\text{H}_2\text{C}=\text{C}(\text{CH}_3)-$ or a group $\text{G}_1-\left[\text{CH}_2-\text{C}(\text{CH}_3)\right]_n-\text{G}_2$;

n has a value from 2 to 10;

G₁ and **G₂** independently of one another are end groups of the polymeric unit, in particular hydrogen or CH₃;

R₂₆ is hydroxyl, C₁-C₁₆alkoxy, morpholino, dimethylamino or -O(CH₂CH₂O)_m-C₁-C₁₆alkyl;

R₂₇ and **R₂₈** independently of one another are hydrogen, C₁-C₆alkyl, phenyl, benzyl, C₁-C₁₆alkoxy or -O(CH₂CH₂O)_m-C₁-C₁₆alkyl, or **R₂₇** and **R₂₈** together with the carbon atom to which they are bonded form a cyclohexyl ring;

m is a number from 1-20;

where **R₂₆**, **R₂₇** and **R₂₈** are not all C₁-C₁₆alkoxy or -O(CH₂CH₂O)_m-C₁-C₁₆alkyl at the same time, and

R₂₉ is hydrogen, $-\text{C}(=\text{O})-\text{CH}=\text{CH}_2$ or $-\text{C}(=\text{O})-\text{C}(\text{CH}_3)=\text{CH}_2$;

R₃₀ and **R₃₂** independently of one another are hydrogen or methyl;

R₃₁ is hydrogen, methyl or phenylthio, where the phenyl ring of the phenylthio radical is unsubstituted or substituted by C₁-C₄alkyl in the 4-, 2-, 2,4- or 2,4,6-position;

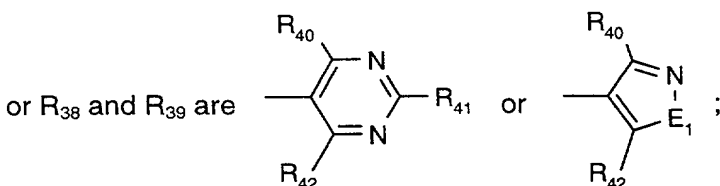
R₃₃ and **R₃₄** independently of one another are C₁-C₂₀alkyl, cyclohexyl, cyclopentyl, phenyl, naphthyl or biphenyl, where these radicals are unsubstituted or are substituted by halogen, C₁-C₁₂alkyl and/or C₁-C₁₂alkoxy, or **R₃₃** is an S- or N-containing 5- or 6-membered

heterocyclic ring, or are $\text{---}\overset{\text{O}}{\underset{\text{||}}{\text{C}}}\text{---R}_{35}$;

R₃₅ is cyclohexyl, cyclopentyl, phenyl, naphthyl or biphenyl, these radicals being unsubstituted or substituted by halogen, C₁-C₄alkyl and/or C₁-C₄alkoxy, or **R₃₅** is an S- or N-containing 5- or 6-membered heterocyclic ring;

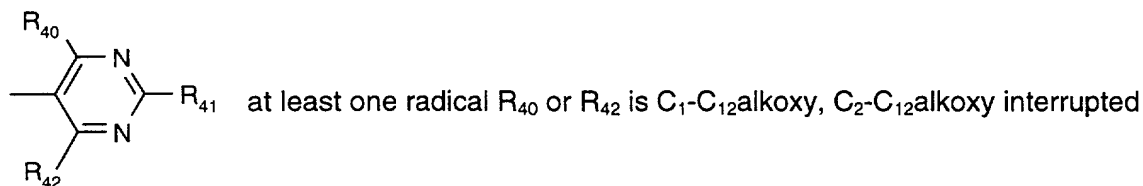
R₃₆ and **R₃₇** independently of one another are unsubstituted cyclopentadienyl or cyclopentadienyl substituted once, twice or three times by C₁-C₁₈alkyl, C₁-C₁₈alkoxy, cyclopentyl, cyclohexyl or halogen; and

R₃₈ and **R₃₉** independently of one another are phenyl which is substituted in at least one of the two ortho positions relative to the titanium-carbon bond by fluorine atoms or CF₃, and which on the aromatic ring may contain, as further substituents, unsubstituted pyrrolinyl or pyrrolinyl substituted by one or two C₁-C₁₂alkyl, di(C₁-C₁₂alkyl)aminomethyl, morpholinomethyl, C₂-C₄alkenyl, methoxymethyl, ethoxymethyl, trimethylsilyl, formyl, methoxy or phenyl; or polyoxaalkyl,



R₄₀, **R₄₁** and **R₄₂** independently of one another are hydrogen, halogen, C₂-C₁₂alkenyl, C₁-C₁₂alkoxy, C₂-C₁₂alkoxy interrupted by one to four O atoms, cyclohexyloxy, cyclopentyloxy, phenoxy, benzyloxy, unsubstituted phenyl or phenyl substituted by C₁-C₄alkoxy, halogen, phenylthio or C₁-C₄-alkylthio; or biphenyl,

where R_{40} and R_{42} are not both hydrogen at the same time and in the radical



by one to four O atoms, cyclohexyloxy, cyclopentyloxy, phenoxy or benzyloxy;

E_1 is O, S or NR_{43} ; and

R_{43} is C_1 - C_8 alkyl, phenyl or cyclohexyl.

15. A process for the photopolymerization of nonvolatile monomeric, oligomeric or polymeric compounds having at least one ethylenically unsaturated double bond, which comprises irradiating a composition according to claim 12 with light in the range from 200 to 600 nm.

16. A process according to claim 15 for the preparation of pigmented and nonpigmented surface coatings, printing inks, screen printing inks, offset printing inks, flexographic printing inks, powder coatings, printing plates, adhesives, dental materials, optical waveguides, optical switches, colour testing systems, composite materials, gel coats, glass-fibre cable coatings, screen printing stencils, resist materials, colour filters, for the encapsulation of electrical and electronic components, for the preparation of magnetic recording materials, of three-dimensional objects by means of stereolithography, of photographic reproductions, image recording material, for holographic recordings, for the preparation of decolouring materials, for the preparation of image recording materials using microcapsules.

17. A coated substrate which has been coated on at least one surface with a composition according to claim 12.

18. A process for the photographic production of relief images in which a coated substrate according to claim 17 is subjected to imagewise exposure and then the unexposed portions are removed with a solvent.